



PATENT
Atty. Dkt. No. APPM/4714.P1/CPI/WCVD/PJS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Xi et al.

Patent No.: 7,101,795

Issued: September 5, 2006

Serial No.: 09/678,266

Filed: October 3, 2000

For: METHOD AND APPARATUS
FOR DEPOSITING
REFRACTORY METAL LAYERS
EMPLOYING SEQUENTIAL
DEPOSITION TECHNIQUES TO
FORM A NUCLEATION LAYER

§
§
§ Group Art Unit: 2827
§
§ Examiner: David A. Zarneke
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§
§

Certificate

DEC 14 2006

of Correction

Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING 37 CFR 1.8	
I hereby certify that this correspondence is being deposited on <u>12/7</u> , 2006 with the United States Postal Service as First Class Mail in an envelope addressed to: Certificate of Correction Branch, Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450.	
<u>12/7/06</u> Date	 Signature

Dear Sir:

REQUEST FOR CERTIFICATE OF CORRECTION

Attached is a Certificate of Correction for correcting several errors throughout the printed patent.

The missing priority data was supplied in the Combined Declaration and Power of Attorney, a copy of which is attached hereto. Also attached is a copy of the Petition for Claiming Benefit of Earlier Filing Date, submitted electronically on May 30, 2006.

The missing references were initialed by the examiner on April 21, 2006 in the Supplemental Notice of Allowability mailed April 27, 2006. Copies of the PTO-1449s and PTO/SB/08a showing the missing references initialed by the examiner are attached.

The amendments to the claims were made by the examiner in the Examiner's Amendment dated August 15, 2006, a copy of which is attached hereto.

DEC 15 2006

Applicants submit that the errors mentioned above were not made by the applicants, but were made during the printing of the patent.

Respectfully submitted,



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Telephone: (713) 623-4844
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Agent for Applicant(s)

UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 7,101,795

Page 1 of 5

APPLICATION NO. : 09/678,266

DATED : October 3, 2000

INVENTOR(S) : Xi et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title Page, Item (63), Related U.S. Application Data: Please add the following priority data:

Continuation-in-part of application No. 09/605,593, filed on Jun. 28, 2000, now Pat. No. 6,551,929.

Title Page, Item (56), References Cited, U.S. PATENT DOCUMENTS: Please include the following references:

6,372,598	4/2002	Kang et al.	438/399
6,369,460	4/2002	Adetutu et al.	257/382
6,368,954	4/2002	Lopatin et al.	438/627
6,358,829	3/2002	Yoon et al.	438/597
6,355,561	3/2002	Sandhu et al.	438/676
6,342,277	1/2002	Sherman	427/562
6,333,260	12/2001	Kwon et al.	438/643
6,284,646	9/2001	Leem	438/629
6,207,487	3/2001	Kim et al.	438/283
6,042,652	3/2000	Hyun et al.	118/719
5,306,666	4/1994	Izumi	437/192
2003/0072975	4/2003	Shero et al.	428/704
2003/0049942	3/2003	Haukka et al.	438/778
6,534,395	3/2003	Werkhoven et al.	438/627
6,482,740	11/2002	Soininen et al.	438/686
6,482,733	11/2002	Raaijmakers et al.	438/633
6,482,262	11/2002	Elers et al.	117/84
6,475,910	11/2002	Sneh	438/685
6,475,276	11/2002	Elers et al.	117/84
6,468,924	10/2002	Lee et al.	438/763
6,451,695	9/2002	Sneh	438/685
6,447,933	9/2002	Wang et al.	428/635
6,423,619	7/2002	Grant et al.	438/589
6,420,189	7/2002	Lopatin	438/2
6,399,491	6/2002	Jeon et al.	438/680
6,391,785	5/2002	Satta et al.	438/704
2003/0032281	2/2003	Werkhoven et al.	438/640
2003/0031807	2/2003	Elers et al.	427/569
2003/0013320	12/2002	Leskela et al.	427/250
2002/0187631	12/2002	Kim et al.	438/637
2002/0187256	12/2002	Elers et al.	427/99

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DEC 15 2005

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 7,101,795

Page 2 of 5

APPLICATION NO. : 09/678,266

DATED : October 3, 2000

INVENTOR(S) : Xi et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

2002/0182320	1/2003	Kim et al.	438/778
2002/0162506	11/2002	Sneh et al.	118/715
2002/0155722	10/2002	Satta et al.	438/704
2002/0121697	9/2002	Marsh	257/751
2002/0117399	8/2002	Chen et al.	205/125
2002/0109168	8/2002	Kim et al.	257/295
2002/0106846	8/2002	Seutter et al.	438/200
2002/0105088	8/2002	Yang et al.	257/774
2002/0094689	7/2002	Park	438/694
2002/0090829	7/2002	Sandhu et al.	438/761
2002/0076837	6/2002	Hujanen et al.	438/3
2002/0076507	6/2002	Chiang et al.	427/569
2002/0061612	5/2002	Sandhu et al.	438/151
2002/0055235	5/2002	Agarwal et al.	438/430
2002/0052097	5/2002	Park	438/507
2002/0048880	4/2002	Lee	438/253
2002/0037630	3/2002	Agarwal et al.	438/460
2002/0031618	3/2002	Sherman	427/569
2002/0019121	2/2002	Pyo	438/618
2002/0007790	1/2002	Park	118/715
2002/0004293	1/2002	Soininen et al.	438/584
2002/0000598	1/2002	Kang et al.	257/301
2001/0054769	12/2001	Raaijmakers et al.	257/758
2001/0054730	12/2001	Kim et al.	257/301
2001/0029094	10/2001	Mee-Young et al.	438/597
2001/0028924	10/2001	Sherman	427/255.28
2001/0024387	9/2001	Raaijmakers et al.	356/200
2001/0009695	7/2001	Saanila et al.	427/255.39
2001/0002280	5/2001	Sneh	427/255.28
6,635,965	10/2003	Lee et al.	

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DEC 15 2006

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 7,101,795

Page 3 of 5

APPLICATION NO. : 09/678,266

DATED : October 3, 2000

INVENTOR(S) : Xi et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title Page, Item (56), References Cited, FOREIGN PATENT DOCUMENTS: Please include the following references:

WO 01/29893	4/2001
WO 01/29891	4/2001
JP 2001/111000	4/2001
WO 02/45167	6/2002
WO 02/067319	8/2002
WO 01/66832	9/2001
EP 1167569	1/2002

Title Page, Item (56), References Cited, OTHER PUBLICATIONS: Please include the following references:

Klaus, et al. "Atomically Controlled Growth of Tungsten and Tungsten Nitride Using Sequential Surface Reactions," Applied Surface Science, 162-163 (2000) 479-491.

"Pulsed Nucleation for Ultra-High Aspect Ratio Tungsten Plugfill"; San-Hyeob Lee et al.; Materials Research Society, 2002, 649-653.

Yang et al. "Atomic Layer Deposition of Tungsten Film from WF_6/B_2H_6 : Nucleation Layer for Advanced Semiconductor Device," Conference Proceedings ULSI XVII (2002) Materials Research Society.

Column 1, Line 6: Before Background of the Disclosure, insert

--This application is a continuation-in-part of U.S. Patent Application Serial No. 09/605,593, filed June 28, 2000, now issued as U.S. Patent No. 6,551,929.--

Column 5, Line 13: Change "A_{xx}" to --A_a--

Column 5, Line 22: Change "to" to --t₁--

Column 7, Claim 1, Line 34: Before "layer", insert --nucleation layer and a bulk deposition--

Column 7, Claim 1, Line 36: Before "nucleation", insert "refractory metal"

Column 7, Claim 1, Line 38: Delete "atop of said nucleation layer,"

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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 7,101,795

Page 4 of 5

APPLICATION NO. : 09/678,266

DATED : October 3, 2000

INVENTOR(S) : Xi et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, Claim 1, Line 39: Before "employing", insert --on said nucleation layer by--

Column 7, Claim 1, Line 40: Change "subject said nucleation layer to a bulk deposition of a compound" to --bulk deposit refractory metal--

Column 7, Claim 2, Line 43: Delete "forming atop of said nucleation layer includes forming"

Column 7, Claim 2, Line 45: Before "employing", insert --is deposited--

Column 7, Claim 3, Line 46: Delete "forming atop of said nucleation layer includes forming"

Column 7, Claim 3, Line 48: Before "employing", insert --is deposited--

Column 7, Claim 4, Line 50: Delete "introducing said first and second gases therein so as to purge said processing chamber of said first reactive gas by"

Column 8, Claim 4, Line 1: Change "therein," to --into the processing chamber after exposing said substrate to the first reactive gas and--

Column 8, Claim 6, Line 9: Change "a" to --the refractory metal--

Column 8, Claim 6, Line 10: Before "subsequently", insert --and--

Column 8, Claim 7, Line 15: Change "a" to --the refractory metal--

Column 8, Claim 9, Line 22: Change "subject" to --subjecting--

Column 8, Claim 10, Line 24: Before "layer", insert --nucleation layer and a bulk deposition--

Column 8, Claim 10, Line 27: Before "while", insert --wherein said second reactive gas comprises a refractory metal selected from the group consisting of titanium (Ti) and tungsten (W),--

Column 8, Claim 11, Line 38: Delete "said second reactive gas includes a refractory metal and"

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,101,795

Page 5 of 5

APPLICATION NO. : 09/678,266

DATED : October 3, 2000

INVENTOR(S) : Xi et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, Claim 11, Line 40: Change "includes" to --comprises--

Column 8, Claim 12, Line 42: Delete "selected from the group consisting of titanium (Ti) and"

Column 8, Claim 13, Line 46: Delete "first"

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



Atty. Dkt. No.4714 P1/AMI-00-11

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

This declaration is of the following type:

- ☐ original
- ☐ divisional
- ☐ continuation
- ☒ continuation-in-part

**MING XI, ASHOK SINHA, MORIS KORI, ALFRED W. MAK, XINLIANG LU, KEN KAUNG LAI AND
KARL A. LITTAU**

My residence, post office address and citizenship are as stated below next to my name. I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

**METHOD AND APPARATUS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING
SEQUENTIAL DEPOSITION TECHNIQUES TO FORM A NUCLEATION LAYER**

SPECIFICATION IDENTIFICATION

The specification of which:

- ☐ is attached hereto
- ☒ was filed on October 3, 2001, having Serial No. 09/678,266 and was amended on _____ (if applicable)
- ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information I know to be material to patentability in accordance with Title 37, Code of Federal Regulations, 1.56,

and which is material to the examination of this application; namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

- ☐ In compliance with this duty there is attached an Information Disclosure Statement in accordance with 37 CFR 1.98.

DEC 15 2006

PRIORITY CLAIM (35 U.S.C. §119)

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America or of any United States Provisional Application(s) listed below, and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

- ☒ No such applications have been filed.
☐ Such applications have been filed as follows:

A. Prior foreign/PCT/provisional application(s) filed within 12 mos. (6 mos. for design) prior to this application, and any priority claims under 35 U.S.C. § 119

<u>Country/PCT</u>	<u>Application No</u>	<u>Date Filed</u>	<u>Priority Claimed</u>
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No

B. All foreign application(s), if any, filed more than 12 mos. (6 mos for design) prior to this U.S. application

Country:
 Application No:
 Filing date:

PRIORITY CLAIM (35 U.S.C. §120)

I hereby claim the benefit under Title 35, United States Code, § 120, of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information that is material to the examination of this application (namely, information where there is substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

- ☐ No such applications have been filed
☒ Such applications have been filed, as follows:

<u>Serial No.</u>	<u>Filing Date</u>	<u>Status</u>
		<u>Patented Pending</u> <u>Abandoned</u>
09/605,593	6/28/2000	Pending

CLC 15 2006

POWER OF ATTORNEY

I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Peter J. Sgarbossa	Registration No. 25,610
Donald Verplancken	Registration No. 33,217
Lawrence Edelman	Registration No. 25,226
Joseph Bach	Registration No. 37,771
Raymond Kam-On Kwong	Registration No. 37,165
James C. Wilson	Registration No. 35,412
Robert W. Mulcahy	Registration No. 25,436
Kenneth C. Brooks	Registration No. 38,393

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Legal Affairs Dept.
Applied Materials, Inc.
P.O. Box 450A
Santa Clara, CA 95052

Direct telephone calls to:

Kenneth C. Brooks
Law Office of Kenneth C. Brooks
512 527-0104

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Full name of sole inventor: Ming Xi

Inventor's signature: Ming Xi Date: 8/10/07
Residence: Milpitas, California
Post Office Address: 138 Beaumere Way
Milpitas, California 95035
U.S.A. Country of Citizenship: People's Republic of China

Full name of second inventor: Ashok Sinha

Inventor's signature: _____ Date: _____
Residence: Palo Alto, California
Post Office Address: 4176 Hubbart Drive
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U.S.A. Country of Citizenship: U.S.A.

EC 15 2006

Full name of third inventor: Moris Kori

Inventor's signature: _____ Date: _____
Residence: Palo Alto, California
Post Office Address: 55 Hamilton Drive
Palo Alto, California 94301
U.S.A. Country of Citizenship: U.S.A.

Full name of fourth inventor: Alfred W. Mak

Inventor's signature: _____ Date: _____
Residence: Union City, California
Post Office Address: 32722 Fellows Court
Union City, California 94587
U.S.A. Country of Citizenship: U.S.A.

Full name of fifth inventor: Xinliang Lu

Inventor's signature: _____ Date: _____
Residence: Sunnyvale, California
Post Office Address: 685 Garland Avenue #54
Sunnyvale, California 94086
U.S.A. Country of Citizenship: People's Republic of China

Full name of sixth inventor: Ken Kaung Lai

Inventor's signature: _____ Date: _____
Residence: Milpitas, California
Post Office Address: 1354 Terra Alta Drive
Milpitas, California 95035
U.S.A. Country of Citizenship: Republic of China (Taiwan)

Full name of seventh inventor: Karl A. Littau

Inventor's signature: _____ Date: _____
Residence: Palo Alto, California
Post Office Address: 3278 Bryant Street
Palo Alto, California 94303
U.S.A. Country of Citizenship: U.S.A.

(Declaration ends with this page)

DEC 15 2006

(iii) The entire delay between the date the claim was due under 37 C.F.R. § 1.78(a)(2)(ii) and the date the claim was filed was unintentional.

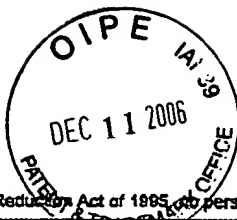
Respectfully submitted,



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Facsimile (713) 623-4846
Attorney for Applicant

469443_1

DEC 15 2006



PTO/SB/17 (01-06)
Approved for use through 07/31/2006. OMB 0851-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL for FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 1370.00)

Complete if Known

Application Number 09/678,266
Filing Date OCTOBER 3, 2000
First Named Inventor KORI, ET AL.
Examiner Name DAVID A. ZARNEKE
Art Unit 2891
Attorney Docket No. APPM/004714.P1/TCG/WCVD/PJS

METHOD OF PAYMENT (check all that apply)

- ☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify) :
☒ Deposit Account Deposit Account Number: 50-1074/004714.P1/RWM. Deposit Account Name: APPLIED MATERIALS, INC.
For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)
☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee
☐ Charge any additional fee(s) or underpayments of fee(s) ☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description		Small Entity	
		Fee (\$)	Fee (\$)
Each claim over 20 (including Reissues)		50	25
Each independent claim over 3 (including Reissues)		200	100
Multiple dependent claims		360	180
Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
_____ -20 or HP= _____	x _____	= _____	
HP = highest number of total claims paid for, if greater than 20.			
Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)
_____ -3 or HP= _____	x _____	= _____	
HP = highest number of independent claims paid for, if greater than 3.			

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets _____ Extra Sheets _____ Number of each additional 50 or fraction thereof _____ Fee (\$) _____ Fee Paid (\$)

_____ - 100 = _____ / 50 = _____ (round up to a whole number) x _____ = _____

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge) : PETITION UNDER 37 CFR § 1.17(t)

Fees Paid (\$)

1370.00

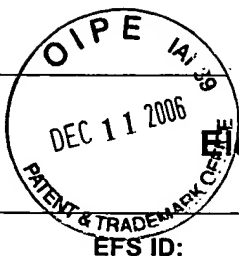
SUBMITTED BY

Signature		Registration No. (Attorney/Agent)	25,436	Telephone	713-623-4844
Name (Print/Type)	ROBERT W. MULCAHY	Date	May 26, 2006		

This collection of information is required by 37 CFR 1.196. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing this form, call 1-800-PTO-0199 (1-800-768-9199) and select option 2.

DEC 15 2006



Electronic Acknowledgement Receipt

EFS ID:	1061526
Application Number:	09678266
Confirmation Number:	4642
Title of Invention:	METHOD AND APPARATUS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING SEQUENTIAL DEPOSITION TECHNIQUES TO FORM A NUCLEATION LAYER
First Named Inventor:	Ming Xi
Correspondence Address:	PATTERSON & SHERIDAN, L.L.P. - 3040 Post Oak Blvd., Suite 1500 - Houston TX 77056 US 713-623-4846 -
Filer:	Keith M. Tackett/Tammi Thomas
Filer Authorized By:	Keith M. Tackett
Attorney Docket Number:	004714
Receipt Date:	30-MAY-2006
Filing Date:	03-OCT-2000
Time Stamp:	17:43:42
Application Type:	Utility
International Application Number:	

Payment information:

DEC 15 2006

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part	Pages
1	Amendment after Notice of Allowance (Rule 312)	APPM004714P1_AMENDMENT_EF.pdf	291991	no	15
Warnings:					
Information:					
2		APPM004714P1_PETITION_EF.pdf	121556	yes	3
	Multipart Description				
	Doc Desc		Start	End	
	Petition for review by the Office of Petitions.		1	2	
	Miscellaneous Incoming Letter		3	3	
Warnings:					
Information:					
Total Files Size (in bytes):			413547		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p>					

DEC 15 2005

IN THE SPECIFICATION:

Please insert the following paragraph at the beginning of the specification before the Background of the Disclosure on page 1:

This application is a continuation-in-part of U.S. Patent Application Serial No. 09/605,593, filed June 28, 2000, now issued as U.S. Patent No. 6,551,929.

DEC 15 2005

REMARKS

This amendment is filed to insert the reference to the priority application at the beginning of the specification. A petition for claiming the benefit of the earlier filing date of the priority application is being submitted in a separate paper.

This amendment is also filed to replace the previously filed informal drawings with the attached eight (8) sheets of formal drawings.

Applicants believe that no new matter has been introduced in this response. Entry of the amendment is respectfully requested.

Respectfully submitted,



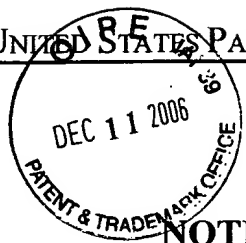
Keith M. Tackett
Registration No. 32,008
PATTERSON & SHERIDAN, L.L.P.
3040 Post Oak Blvd. Suite 1500
Houston, TX 77056
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Attorney for Applicant(s)

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DEC 15 2006



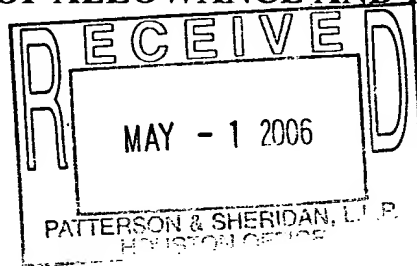
UNITED STATES PATENT AND TRADEMARK OFFICE



UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

**CORRECTED
NOTICE OF ALLOWANCE AND FEE(S) DUE**

7590 04/27/2006
PATTERSON & SHERIDAN, L.L.P.
3040 Post Oak Blvd., Suite 1500
Houston, TX 77056



EXAMINER	
ZARNEKE, DAVID A	
ART UNIT	PAPER NUMBER
2891	
DATE MAILED: 04/27/2006	

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,266	10/03/2000	Ming Xi	004714	4642

TITLE OF INVENTION: METHOD AND APPARATUS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING SEQUENTIAL DEPOSITION TECHNIQUES TO FORM A NUCLEATION LAYER.

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$0	\$1400	07/27/2006

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

- A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.
- B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

- A. Pay TOTAL FEE(S) DUE shown above, or
- B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

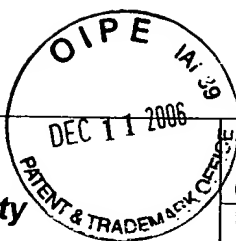
II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

DEC 15 2006

**Supplemental
Notice of Allowability**



Application No.

09/678,266

Examiner

David A. Zarneke

Applicant(s)

XI ET AL.

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the approval of the petition to revive.
2. ☒ The allowed claim(s) is/are 1-14.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 8/19/03 & 9/20/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DEC 15 2006

REASONS FOR ALLOWANCE

The petition to revive having been approved on 1/12/06, the application is in condition of allowance.

Claims 1-14 have been allowed over the prior art.

The following is an examiner's statement of reasons for allowance: the IDS's filed 8/19/03 and 9/20/04 do not affect the allowability of the claims.

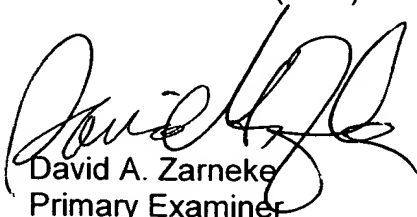
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Baumeister can be reached on (571)-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

DEC 15 2006

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David A. Zarneke
Primary Examiner
April 21, 2006

DEC 15 2006

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. AMAT/4714.P1/TCG/ WCVD/BG	Serial No. 09/678,266
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Applicant Kori, et al.	Confirmation No.: 4642
(Use several sheets if necessary)		Filing Date October 3, 2000	Group Examiner
Examiner D. Zameke			

U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
	A1	6,372,598	04/16/02	Kang, et al.	438	399	06/16/99
	A2	6,369,430	04/09/02	Adetutu, et al.	257	382	04/02/01
	A3	6,368,954	04/09/02	Lopatin, et al.	438	627	07/28/00
	A4	6,358,829	03/19/02	Yoon, et al.	438	597	09/16/99
	A5	6,355,561	03/12/02	Sandhu, et al.	438	676	11/21/00
	A6	6,342,277	01/29/02	Sherman	427	562	04/14/99
	A7	6,333,260	12/25/01	Kwon, et al.	438	643	06/24/99
	A8	6,284,646	09/04/01	Leem	438	629	08/19/98
	A9	6,207,487	03/27/01	Kim, et al.	438	238	10/12/99
	A10	6,042,652	03/28/00	Hyun, et al.	118	719	09/07/99
	A11	5,306,666	04/26/94	Izumi	437	192	07/21/93
	A12	2003/0072975	04/17/03	Shero, et al.	428	704	09/26/02
	A13	2003/0049942	03/13/03	Haukka, et al.	438	778	08/22/02

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
	B1	01/29893	04/26/01	WO	H01L	21/768	<input type="checkbox"/>	<input type="checkbox"/>
	B2	01/29891	04/26/01	WO	H01L	21/768	<input type="checkbox"/>	<input type="checkbox"/>
	B3	2001-111000	04/20/01	JP	H01L	27/105	<input type="checkbox"/>	<input type="checkbox"/>

OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C1	
	C2	
	C3	
Examiner		Date Considered 4/21/06

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.

DEC 15 2005

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		COPY	Docket No. AMAT/4714.P1/TCG/ WCVD/BG	Serial No. 09/678,266
INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Applicant Kori, et al.	Confirmation No.: 4642
(Use several sheets if necessary)			Filing Date October 3, 2000	Group 2827
Examiner D. Zameke				

U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
	A1	6,534,395	03/18/03	Werkhoven, et al.	438	627	03/06/01
	A2	6,482,740	11/19/02	Soininen, et al.	438	686	05/15/01
	A3	6,482,733	11/19/02	Raaijmakers, et al.	438	633	04/26/01
	A4	6,482,262	11/19/02	Elers, et al.	117	84	10/13/00
	A5	6,475,910	11/05/02	Sneh	438	685	09/22/00
	A6	6,475,276	11/05/02	Elers, et al.	117	84	10/13/00
	A7	6,468,924	10/22/02	Lee, et al.	438	763	05/31/01
	A8	6,451,695	09/17/02	Sneh	438	685	12/22/00
	A9	6,447,933	09/10/02	Wang, et al.	428	635	04/30/01
	A10	6,423,619	07/23/02	Grant, et al.	438	589	11/30/01
	A11	6,420,189	07/16/02	Lopatin	438	2	04/27/01
	A12	6,399,491	06/04/02	Jeon, et al.	438	680	04/06/01
	A13	6,391,785	05/21/02	Satta, et al.	438	704	08/23/00

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
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	B1	02/45167	06/06/02	WO	H01L	27/00	<input type="checkbox"/>	<input type="checkbox"/>
	B2	02/067319	08/29/02	WO	H01L	21/768	<input type="checkbox"/>	<input type="checkbox"/>
	B3	01/66832	09/13/01	WO	C30B	25/14	<input type="checkbox"/>	<input type="checkbox"/>

OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C1	Klaus, et al. "Atomically Controlled Growth of Tungsten and Tungsten Nitride Using Sequential Surface Reactions," Applied Surface Science, 162-163 (2000) 479-491
	C2	
	C3	

Examiner

Date Considered

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.

Sheet 3 of 5 sheet(s)

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		COPY	Docket No. AMAT/4714.P1/TCG/ WCVD/BG	Serial No. 09/678,266
INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Applicant Kori, et al.	Confirmation No.: 4642
(Use several sheets if necessary)			Filing Date October 3, 2000	Group Examiner
Examiner D. Zarneke				

U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
	A1	2003/0032281	02/13/03	Werkhoven, et al.	438	640	09/23/02
	A2	2003/0031807	02/13/03	Elers, et al.	427	569	09/17/02
	A3	2003/0013320	12/05/02	Leskela, et al.	427	250	03/15/02
	A4	2002/0187631	12/12/02	Kim, et al.	438	637	12/05/01
	A5	2002/0187256	12/12/02	Elers, et al.	427	99	07/30/02
	A6	2002/0182320	01/16/03	Kim, et al.	438	778	05/31/01
	A7	2002/0162506	11/07/02	Sneh, et al.	118	715	06/28/02
	A8	2002/0155722	10/24/02	Satta, et al.	438	704	04/15/02
	A9	2002/0121697	09/05/02	Marsh	257	751	04/30/02
	A10	2002/0117399	08/29/02	Chen, et al.	205	125	02/23/01
	A11	2002/0109168	08/15/02	Kim, et al.	257	295	01/30/02
	A12	2002/0106846	08/08/02	Seutter, et al.	438	200	02/02/01
	A13	2002/0105088	08/08/02	Yang, et al.	257	774	10/31/01

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
	B1	1,167,569	01/02/02	EP	C23C	16/455	<input type="checkbox"/>	<input type="checkbox"/>
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	B3						<input type="checkbox"/>	<input type="checkbox"/>

OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C1	
	C2	
	C3	
Examiner:		Date Considered 9/20/06

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		COPY	Docket No. AMAT/4714.P1/TCG/ WCVD/BG	Serial No. 09/678,266
INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Applicant Kori, et al.	Confirmation No.: 4642
(Use several sheets if necessary)			Filing Date October 3, 2000	Group Examiner
Examiner D. Zarneke				

U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
	A1	2002/0094689	07/18/02	Park	438	694	03/07/02
	A2	2002/0090829	07/11/02	Sandhu, et al.	438	761	01/31/02
	A3	2002/0076837	06/20/02	Hujanen, et al.	438	3	11/28/01
	A4	2002/0076507	06/20/02	Chiang, et al.	427	569	10/24/01
	A5	2002/0061612	05/23/02	Sandhu, et al.	438	151	01/14/02
	A6	2002/0055235	05/09/02	Agarwal, et al.	438	430	10/29/01
	A7	2002/0052097	05/02/02	Park	438	507	05/03/01
	A8	2002/0048880	04/25/02	Lee	438	253	08/08/01
	A9	2002/0037630	03/28/02	Agarwal, et al.	438	430	10/29/01
	A10	2002/0031618	03/14/02	Sherman	427	569	10/09/01
	A11	2002/0019121	02/14/02	Pyo	438	618	06/20/01
	A12	2002/0007790	01/24/02	Park	118	715	05/03/01
	A13	2002/0004293	01/10/02	Soininen, et al.	438	584	05/15/01

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
	B1						YES	NO
	B2						<input type="checkbox"/>	<input type="checkbox"/>
	B3						<input type="checkbox"/>	<input type="checkbox"/>


OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C1	
	C2	
	C3	

Examiner	Date Considered
*EXAMINER: Initial if reference considered. Whether or not citation is in conformance with MPEP.609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.	

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. AMAT/4714.P1/TCG/ WCVD/BG	Serial No. 09/678,266
COPY INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Applicant Kori, et al.	Confirmation No.: 4642
		Filing Date October 3, 2000	Group Examiner
(Use several sheets if necessary)			
Examiner D. Zarneke			

U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
	A1	2002/0000598	01/03/02	Kang, et al.	257	301	07/26/01
	A2	2001/0054769	12/27/01	Raaijmakers, et al.	257	758	04/26/01
	A3	2001/0054730	12/27/01	Kim, et al.	257	301	05/23/01
	A4	2001/0029094	10/11/01	Mee-Young, et al.	438	597	09/16/99
	A5	2001/0028924	10/11/01	Sherman	427	255.28	05/24/01
	A6	2001/0024387	09/27/01	Raaijmakers, et al.	365	200	02/22/01
	A7	2001/0009695	07/26/01	Saanila, et al.	427	255.39	01/18/01
	A8	2001/0002280	05/31/01	Sneh	427	255.28	12/22/00
	A9						
	A10						
	A11						
	A12						
	A13						

Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
	B1						<input type="checkbox"/>	<input type="checkbox"/>
	B2						<input type="checkbox"/>	<input type="checkbox"/>
	B3						<input type="checkbox"/>	<input type="checkbox"/>

OTHER ART

*Examiner Initial	Including Author, Title, Date, Pertinent Pages, Etc.	
Examiner	Date Considered	DEC 15 2006
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.		

Substitute for form 1449A/PTO

**SUPPLEMENTAL INFORMATION
DISCLOSURE STATEMENT BY
APPLICANT**

(Use as many sheets as necessary)

Sheet 1

of 1

Application Number

09/678,266

Filing Date

October 3, 2000

First Named Inventor

Xi, et al.

Group Art Unit

2827

Examiner Name

David Zarneke

Attorney Docket Number

AMAT/4714.P1/TCG/WCVD/PJS

Submission Date

September 15, 2004

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)			
	A1	6,635,965	10/21/2003	Lee, et al.	
	A2				
	A3				
	A4				
	A5				
	A6				
	A7				
	A8				
	A9				
	A10				
	A11				
	A12				
	A13				
	A14				
	A15				
	A16				
	A17				
	A18				

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NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ²
	C1	"Pulsed Nucleation for Ultra-High Aspect Ratio Tungsten Plugfill"; San-Hyeob Lee, et. al; Materials Research Society, 2002, 649-653.	
	C2	Yang, et al. "Atomic Layer Deposition of Tungsten Film from WF ₆ /B ₂ H ₆ : Nucleation Layer for Advanced Semiconductor Device," Conference Proceedings ULSI XVII (2002) Materials Research Society.	

DEC 15 2006

Examiner

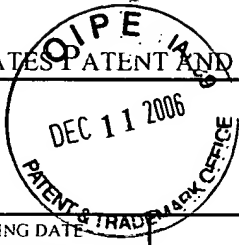
Date Considered

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.



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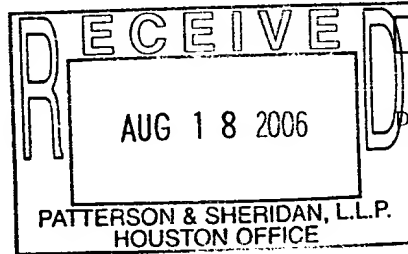
APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678.266	10/03/2000	Ming Xi	004714	4642

7590 08/15/2006

PATTERSON & SHERIDAN, L.L.P.
3040 Post Oak Blvd., Suite 1500
Houston, TX 77056

EXAMINER

ZARNEKE, DAVID A



ART UNIT	PAPER NUMBER
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2891

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

FILE NUMBER APPN/604714.P1/TC6/WCVD
FORWARDED TO BTP/MP
REVIEWED ONLY 8-21-06
REVIEWED/DOCKETED _____
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PREVIOUSLY DK'T _____

DEC 15 2006



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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
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EXAMINER

ART UNIT	PAPER
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20060531

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

see attached supplemental examiner's amendment.

DEC 15 2006

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Keith Tackett on May 31, 2006.

The application has been amended as follows: See the attached pages for the amendments. These amendments to the claims are the changes mailed in amendment filed on 8/19/03, but could not be entered because the application was abandoned at that time.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Zarneke whose telephone number is (571)-272-1937. The examiner can normally be reached on M-Th 7:30 AM-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Baumeister can be reached on (571)-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

DEC 15 2006

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



David A. Zarneke
Primary Examiner
May 31, 2006

Examiner-Initiated Interview Summary

Application No.

09/678,266

Applicant(s)

XI ET AL.

Examiner

David A. Zameke

Art Unit

2891

All Participants:(1) David A. Zameke.(2) Keith Tackett.**Status of Application:** _____

(3) _____

(4) _____

Date of Interview: 31 May 2006**Time:** _____**Type of Interview:**☒ Telephonic☐ Video Conference☐ Personal (Copy given to: ☐ Applicant ☐ Applicant's representative)Exhibit Shown or Demonstrated: ☐ Yes ☐ No

If Yes, provide a brief description:

Part I.

Rejection(s) discussed:

Claims discussed:

Prior art documents discussed:

Part II.

SUBSTANCE OF INTERVIEW DESCRIBING THE GENERAL NATURE OF WHAT WAS DISCUSSED:

*See Continuation Sheet***Part III.**☒ It is not necessary for applicant to provide a separate record of the substance of the interview, since the interview directly resulted in the allowance of the application. The examiner will provide a written summary of the substance of the interview in the Notice of Allowability.☐ It is not necessary for applicant to provide a separate record of the substance of the interview, since the interview did not result in resolution of all issues. A brief summary by the examiner appears in Part II above.

(Examiner/SPE Signature)

DEC 15 2006

(Applicant/Applicant's Representative Signature – if appropriate)

Continuation of Substance of Interview including description of the general nature of what was discussed: The attached supplemental examiner's amendment was discussed. It was noted that the amendment filed 8/19/03 could not be entered into the record because the application was under abandonment at that time. This examiner's amendment enters those changes to the claims into record. .

DEC 15 2006

CLAIM AMENDMENTS TO BE ENTERED

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A method for forming a nucleation layer and a bulk deposition layer on a substrate disposed in a processing chamber, said method comprising:

forming a refractory metal nucleation layer by serially exposing said substrate to first and second reactive gases; and

forming ~~atop of said nucleation layer,~~ a bulk deposition layer on said nucleation layer by employing vapor deposition to ~~subject said nucleation layer to a bulk deposition of deposit~~ a compound refractory metal contained in one of said first and second reactive gases.

2. (Currently Amended) The method as recited in claim 1 wherein ~~forming atop of said nucleation layer includes forming~~ said bulk deposition layer is deposited employing chemical vapor deposition.

3. (Currently Amended) The method as recited in claim 1 wherein ~~forming atop of said nucleation layer includes forming~~ said bulk deposition layer is deposited employing physical vapor deposition.

4. (Currently Amended) The method as recited in claim 1 wherein forming a nucleation layer further includes ~~introducing said first and second gases therein so as to purge said processing chamber of said first reactive gas by introducing a purge gas therein,~~ into the processing chamber after exposing said substrate to the first reactive gas and before exposing said substrate to said second reactive gas.

5. (Original) The method as recited in claim 1 wherein forming a nucleation layer further includes purging said processing chamber of said first reactive gas by pumping said processing chamber clear of all gases disposed therein before introducing said second reactive gas.

6. (Currently Amended) The method as recited in claim 1 wherein forming a the refractory metal nucleation layer further includes purging said processing chamber of said first reactive gas by introducing a purge gas and subsequently pumping said

processing chamber clear of all gases disposed therein before exposing said substrate to said second reactive gas.

7. (Currently Amended) The method as recited in claim 1 wherein forming a the refractory metal nucleation layer includes forming alternating layers of a boron-containing compound and a refractory metal compound onto said substrate.

8. (Original) The method as recited in claim 7 wherein the boron-containing compound is diborane B_2H_6 .

9. (Currently Amended) The method as recited in claim 7 further including subject subjecting said substrate to a purge gas following formation of each of said alternating layers.

10. (Currently Amended) A method for forming a nucleation layer and a bulk deposition layer on a substrate, said method comprising:

serially exposing said substrate to first and second reactive gases, wherein said second reactive gas comprises a refractory metal selected from the group consisting of titanium (Ti) and tungsten (W), while said substrate is disposed in a processing chamber, to form a nucleation layer;

removing from said processing chamber said first reactive gas before exposing said substrate to said second reactive gas;

forming said layer adjacent to said nucleation layer by chemical vapor deposition while said substrate is disposed in said processing chamber by concurrently exposing said nucleation layer to said second reactive gas and a reducing agent.

11. (Currently Amended) The method of claim 10 wherein ~~said second reactive gas includes a refractory metal~~ and said reducing agent ~~includes~~ comprises silane.

12. (Currently Amended) The method of claim 11 wherein said refractory metal is ~~selected from the group consisting of titanium (Ti) and tungsten (W)~~.

13. (Currently Amended) The method of claim 10 wherein removing from said processing chamber further includes introducing a purge gas into said processing

chamber and pumping said ~~first~~ processing chamber clear of all gases present therein.

14. (Original) The method as recited in claim 10 wherein said nucleation layer has a thickness in the range of 10 to 100 Å.

15-20. (Canceled)
